

141 WHAT IS CLAIMED IS:

2 1. ~~A method of determining the percentage of a fluid~~  
3 present in a mixture of fluids flowing through a predetermined  
4 region of a conduit, the said method comprising obtaining a  
5 measurement of at least one electrical property of the mixture in  
6 said region, measuring the speed of flow of the mixture in said  
7 region, and employing the said measurement and the speed of flow  
8 to derive the said percentage.

9 2. A method as claimed in claim 1 in which the temperature  
10 of the said mixture in the said region is obtained and is employed in  
11 the calculation of the said percentage.

12 3. A method as claimed in claim 1 or 2 in which the mixture  
13 is a mixture of first and second liquids such that, when ~~the or a~~ said  
14 electrical property is plotted against the said percentage, two data  
15 curves, or families of data curves, are obtained which are separated  
16 from each other and which respectively represent the first liquid in  
17 the continuous phase and the second liquid in the continuous phase.

18 4. A method as claimed in claim 3 in which the said first  
19 and second liquids are respectively water and oil.

20 5. A method as claimed in claim 3 or 4 in which the  
21 derivation of the said percentage involves determining whether the  
22 first or second liquid is in the continuous phase, selecting the  
23 ~~appropriate data curve, and obtaining a reading from the latter.~~

1        ~~6. A method as claimed in claim 5 in which the~~  
2 determination as to whether the first or second liquid is in the  
3 continuous phase is effected by comparing the said measurement of  
4 the electrical property or properties to a predetermined value, and  
5 the other data curve or family of curves being selected when the said  
6 measurement is below the predetermined value.

7        7. Apparatus for determining the percentage of a fluid  
8 present in a mixture of fluids flowing through a predetermined region  
9 of a conduit, said apparatus comprising electrical property or  
10 properties of the mixture in said region; flow measuring means for  
11 measuring the speed of flow of the mixture in said region; and  
12 calculator means arranged to receive signals from the electrical  
13 property measuring means and from the flow measuring means and  
14 to calculate the said percentage therefrom.

15        8. Apparatus as claimed in claim 7 in which the apparatus  
16 comprises temperature measuring means for measuring the  
17 temperature of the mixture in said region, the calculator means being  
18 arranged to receive signals from all said measuring means and to  
19 calculate the said percentage therefrom.

20        9. Apparatus as claimed in claim 8 in which the calculator  
21 means comprises memory means programmed with data relating to  
22 whether a first liquid or a second liquid of said mixture is in the  
23 ~~continuous phase, the calculator means having data selection means~~

1 ~~arranged to select the data to be employed in calculating the said~~  
2 ~~percentage.~~

3 10. Appartus as claimed in claim 9 in which the data  
4 selection means comprises a comparator arranged to select the date  
5 to be employed in calculating the said percentage, the comparator  
6 comparing the said measurement with a predetermined value and  
7 selecting the data in accordance with whether the said measurement  
8 is above or below the predetermined value.

9 11. Apparatus as claimed in any of claim 10 in which the  
10 flow measuring means is arranged to send a signal representative of  
11 mass flow through the conduit to a multiplier where the mass flow is  
12 multiplied by the said percentage to produce an indication of the  
13 mass flow of the fluid whose percentage has been calculated.

14 12. Apparatus as claimed in claim 11 comprising a subtractor  
15 of subtracting the last-mentioned mass flow from the total mass  
16 flow.

Sub. 17 13. A comparator circuit for use in determining phase  
18 conditions of fluids where there is a pronounced step jump or  
19 discontinuity joining two independent family of curves such as in the  
20 electrical properties of an oil/water mixture or the flow  
21 characteristics of a fluid, said compartor circuit receiving data from a  
22 a plurality of probes such as an oil/water monitor or a turbine flow  
23 meter comprising:

1           a.    a first memory for storing a first data curve  
2 representing a first set of phase characteristics;

3           b.    a second memory for storing a second data curve  
4 representing a second set of phase characteristics;

5           c.    a computer means for receiving the data from the  
6 probe, said computer means comparing the data received to a  
7 predetermined value thereby allowing said computer means to  
8 select said first memory if the data received from one probe is  
9 less than the predetermined value or to select said second  
10 memory if the data received from the probe is greater than the  
11 predetermined value, and

12           d.    a computer means to affect a secondary correction  
13 to the first probe measurement.